IP over Ethernet (IPoE) Session Health Checking

draft-patterson-intarea-ipoe-health-04
IPoE (DHCP) vs PPPoE

- Less encapsulation overhead.
- Simpler connection establishment.
- Port-based authentication preferred over CHAP-style user+password.
- PPPoE would require DHCPv6 anyway.
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However:
• Missing connectivity verification checks, à la PPP Keepalive.
PPP Keepalives
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SVCMGR #2501 Base Subscriber deleted
"Subscriber 7050afffe898@skydsl:30000001 has been removed from the system"

Restart PPPoE client
PPP Keepalives

- PADI
- PADO
- PADR
- PADS

Access-Request
Access-Accept

BNG

RADIUS
"host connectivity lost on 3/1/1:3941.122 in service 400000 for inetAddr = fe80::f00:baa, chAddr=70:50:af:00:05:a9, verify-addr=fe80::f00:baa."
IPoE Stale State

Layer 2 Metro Access

BNG
IPoE Stale State

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BNG
IPoE Stale State

IA Prefix
Option: IA Prefix (26)
Length: 25
Value: 00000e100000e10382a020c7f082fd7000000000000000000...
Preferred lifetime: 3600
Valid lifetime: 3600
Prefix length: 56
Prefix address: 2a02:c7f:82f:d700::
IPoE Stale State

T1: 0

DHCPv[46] RENEW

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IPoE Stale State
IPoE Stale State

T1: 0
T2: 0
Valid lifetime: 0

DHCPv4 DISCOVER
DHCPv6 SOLICIT

OFFER/ADVERTISE

REQUEST

ACK/CONFIRM

Access-Request
Access-Accept

RADIUS

BNG
IPoE Session Health Check

- Parameters & Configuration.
- Health Check Mechanisms.
- Actions & Behaviours.
Parameters & Configuration

- **Interval** (Integer): The frequency in seconds, which health checks are sent by the IPoE client.
- **Retry Interval** (Integer): The frequency in seconds, which health checks are sent by the IPoE client, after a failure.
- **Limit** (Integer): The number of failed consecutive checks before an action is taken.
- **Behaviour** (Integer): Specifies what actions are to be taken when triggered.
- **Passive** (Boolean): Forces passive health checks instead of active.
- **Layer2** (Boolean): Forces layer 2 health checks instead of BFD echo.
- **Alternative Target Address** (IP address): Overrides the default target of health checks.
Parameters & Configuration

• Signalled via DHCP.
  – New Option for both DHCPv4 and DHCPv6.

• Local configuration.
  – Default.
  – Manual.
  – NETCONF.
  – TR-069.
  – Etc.
Health Check Mechanisms

- **BFD Echo.** *(Preferred)*
  - Lightweight.
  - Uses forwarding plane, no impact on control plane.
  - IP-based, validates DHCP lease state as well as layer 2 path.

- **ARP & Neighbor Discovery.**
  - Default gateway [default].

- **Passive.**
  - Makes use of the same parameters.
  - Checks the host OS’ ARP & Neighbor cache tables.
**Actions & Behaviours**

- **Renew.** [default]
  - Softest approach.
  - In-line with existing methods such as those defined in TR-146.
- **Rebind.**
  - Useful in topologies with multiple DHCP servers.
- **Solicit.**
  - Quickest recovery option in networks requiring SOLICIT/DISCOVER for authentication.
- **Expire & Release.**
  - Most aggressive approach.
  - Useful in networks that could retain stale lease information. E.g., Stateful DHCP relays.